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# PROGRAM GUIDE: Smart Agriculture and Food Digitization and Automation Challenge

## PROGRAM OVERVIEW

### Background

Agriculture plays a critical role in every country's well-being by providing food and raw materials. It is estimated that agricultural production needs to increase 60-70% to meet projected food demand in 2050, when global population is anticipated to be 9.7 billion. As such, the agri-food industry is challenged to produce more and better products. Few countries are better positioned than Canada to sustainably increase agri-food production. Alberta plays a crucial role in Canada's agriculture sector. In 2019, Alberta produced 32% of Canadian wheat, 29% of Canadian canola, 48% of our barley, and 20% of the nation's oats and accounted for more than 40% of the nation's total cattle and calf inventory. Its exports of primary and processed agricultural and food products totaled \$11.6 billion, making the province the third-largest exporter of agri-food products in the country.

The agriculture sector is one of Alberta's most sustainable industries. Agriculture is critical to the province's economic diversification efforts and a potential driver of greater technological innovation. At the same time, the sector faces many challenges that can negatively impact productivity and profitability. The current COVID-19 pandemic has also highlighted the importance of agility and adaptability of supply chains to changing consumer demands and trade barriers. Consumers are concerned about food sourcing and sustainability and are demanding greater transparency in food supply chains. As farms become larger, the complexity of operations increases. This challenges producers to manage these new business structures. To keep up, producers continually need to develop and adopt new skillsets and technological solutions. The use of smart technology and adoption of new practices and solutions has significant potential to address these challenges and drive economic, environmental, and social benefits in Alberta's agriculture sector.

Smart agriculture is a concept focusing on the development and application of innovative technology to increase the quantity and quality of agriculture and agri-food products across the value-chain. Examples of smart agriculture solutions include mobile internet solutions that facilitate precision farming, remote sensing of livestock grazing patterns, and recommendations for spray timing based on weather conditions. It is estimated that the use of smart technologies relevant to agriculture could have a global economic impact between \$14 trillion and \$33 trillion a year in 2025. The smart agriculture ecosystem in Alberta is a robust and innovative space. We are well positioned to develop and implement the use of smart technology in the agri-food sector.

This Program will support projects that result in smart technology development or knowledge generation that can potentially increase productivity, reduce cost of production or increase the value of Alberta agri-food commodities. Projects must provide solutions to challenges faced by the agri-food sector and clearly demonstrate the social, economic and environmental benefits to Alberta's agri-food industry.

**Smart Technologies for this Program include but are not limited to:**

- Digital transformation of the agri-food sector
  - Development of new applications for digitalization of the agri-food sector utilizing tools, such as machine learning and artificial intelligence, to develop data-driven decision models.
  - Prototype development and validation of new technologies, such as the use of remote monitoring and imaging data.
- Automation throughout the agri-food value chain
  - Research into autonomous systems and prototype development that reduce cost or improve quality and safety of agriculture and food products.
- Validation of new smart technologies and solutions to increase farm productivity and supply chain functionality and mitigate the impact of biotic and abiotic stress.

**Examples of challenges to be addressed in this Program include but are not limited to:**

- Farm Productivity: There is a need for digital integration to optimize farming systems and reduce cost of production. How can technology be integrated to improve farm productivity and profitability through data-enabled decision making?
- Supply Chain: Agriculture value chains are multi-stakeholder systems, often with little communication between members. The internet of things, the blockchain, and big data technologies are potential enablers of more efficient and sustainable supply chains. How can digital or automation innovations improve value chains to maximize functionality and/or reduce waste?
- Biotic and Abiotic Stress: Agriculture faces multiple threats to production, such as pests and diseases, drought, flooding, hail and frost. How can digital technologies inform decision making and reduce losses due to biotic and abiotic stress?

## Opportunities that are considered out of scope for this Program:

- Conventional agriculture research including biotechnology, agronomy, demonstration and adaptation research.
- Marketing or new food product development in the agri-food value chain.
- Projects focusing on the reduction of greenhouse emissions mitigation, abatement, and sequestration.

## PROGRAM DETAILS

Projects considered under this Program must fit in one of the following two project types:

**Innovation-Commercialization (Technology Development):** Projects in this area focus on developing or advancing technology solutions that will be used by the Applicant, their partners and/or identified end-users to advance commercialization and broad deployment of the solution in Alberta. The outcomes of the projects or the commercialization pathway of the technology solution should have a direct impact resulting in economic, environmental and social benefits. These projects include the use of Technology Readiness Levels (TRL), which are a measurement system used to assess the maturity level of a technology. There are nine technology readiness levels, with 1 being the least ready and 9 being already used in real-life conditions. This Program will fund projects between TRL 3 and 7. A description of each [Technology Readiness Level is included in here.](#)

**What smart technology can be used to address a given challenge in Alberta's agriculture sector?**

**Knowledge Generation:** Projects in this area focus on the development of knowledge to address a gap or bring new insights to help advance a technical, process or policy innovation. Projects may gather new scientific data and information that enable economic, environmental and social benefits for Albertans by informing policy and regulatory development, furthering understanding of emerging technology trends and opportunities, enhancing citizen engagement in the generation of new knowledge, and exploring market sector challenges and barriers to implementing technology. A key objective for these projects is to develop a plan to share the knowledge generated with appropriate stakeholders and end-users and ensure progress towards desired outcomes. TRLs are not included in Knowledge Generation projects.

**What knowledge can be generated to develop a smart technology to address a challenge in Alberta's agriculture sector?**

Projects must clearly demonstrate that a market exists for implementation of the proposed technology or knowledge solution. Potential end-users must be identified and are preferably engaged with the project.

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*Alberta Innovates' Smart Agriculture and Food Digitization and Automation Challenge is making available up to \$2,000,000 CAD to support Projects that provide solutions to challenges faced by the agri-food sector in Alberta and clearly demonstrate the social, economic and environmental benefits to the province. Funding for individual Projects will be a maximum of \$500,000 CAD.*

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# HOW THE PROGRAM WORKS

## Eligibility

### (a) Applicant Eligibility Criteria

The Lead Applicant can be from within either the agri-food or technology industries. Examples include industrial associations, small and medium-sized enterprises (SMEs), research and development (R&D) organizations, post-secondary institutions, municipalities, not-for-profit organizations and government research labs (providing they are legally able to execute the [Investment Agreement](#) found on the Alberta Innovates website). Applicants are not required to be based in Alberta but, must demonstrate a clear value proposition for the province.

Eligible Applicants must have demonstrated expertise with respect to:

- identifying and addressing critical agri-business issues, including economic, environmental and social acceptance;
- applying scientific and/or engineering fundamentals relevant to their proposed smart technologies and/or solutions;
- undertaking and successfully completing scientific and technical laboratory and other small-scale practical work on, or relevant to their project.

All Applicants must be in good financial standing with Alberta Innovates and its subsidiaries, InnoTech Alberta and C-Fer Technologies.

\*Please note, Alberta Innovates may perform a corporate search and may also seek bankruptcy and litigation searches.

### (b) Collaborator Eligibility Criteria

Applicants are encouraged to include additional funding Collaborators, but having Collaborators is not mandatory.

Collaboration between multiple organizations is encouraged to enhance and leverage the value proposition by demonstrating opportunities for technology validation and sharing of results. Applicants are encouraged to engage and include Alberta's post-secondary and research institutions in the project consortium where appropriate. It is desirable for projects to attract and train highly qualified personnel who can increase Alberta's innovation capacity. When the applicant is not based in the province, it is especially encouraged to have Alberta-based Collaborators.

To qualify for funding all Collaborators must:

- demonstrate that the relationship between the Applicant and the Project Partner(s) does not create a conflict of interest;
- provide the service(s) and/or product(s) at reasonable market rates;
- be legally permitted to enter, remain in, and perform the services in Canada during the Project Term; and

- be in good financial standing with Alberta Innovates and its subsidiaries InnoTech Alberta and C-Fer Technologies.

Other funding agencies are considered eligible Project Partners.

Letters of support and/or confirmation of contributions from interested end-users are strongly encouraged to accompany the Application, but are not a requirement.

### (c) Project Eligibility Criteria

To qualify for funding, all Projects must:

- be stepped with critical “go/no go” milestones;
- be completed by December 31, 2023; and
- submit to other criteria that Alberta Innovates may develop from time to time.

## Program Objectives and Performance Measurement

The Program’s objective is to provide an opportunity to **develop and employ smart technology and generate knowledge that will increase productivity, reduce cost of production or increase the value of agri-food commodities in a sustainable way, while generating prosperity and employment in Alberta.**

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*Over the life of a Project, Alberta Innovates employs an active project management philosophy, regularly monitoring performance and supporting the Applicant to reach their objectives. Funding is tied to outcomes and achievement of results. For this reason, Alberta Innovates funds on a milestone completion basis. This means the Applicant is expected to submit a Progress Report before Alberta Innovates advances the next tranche of funds.*

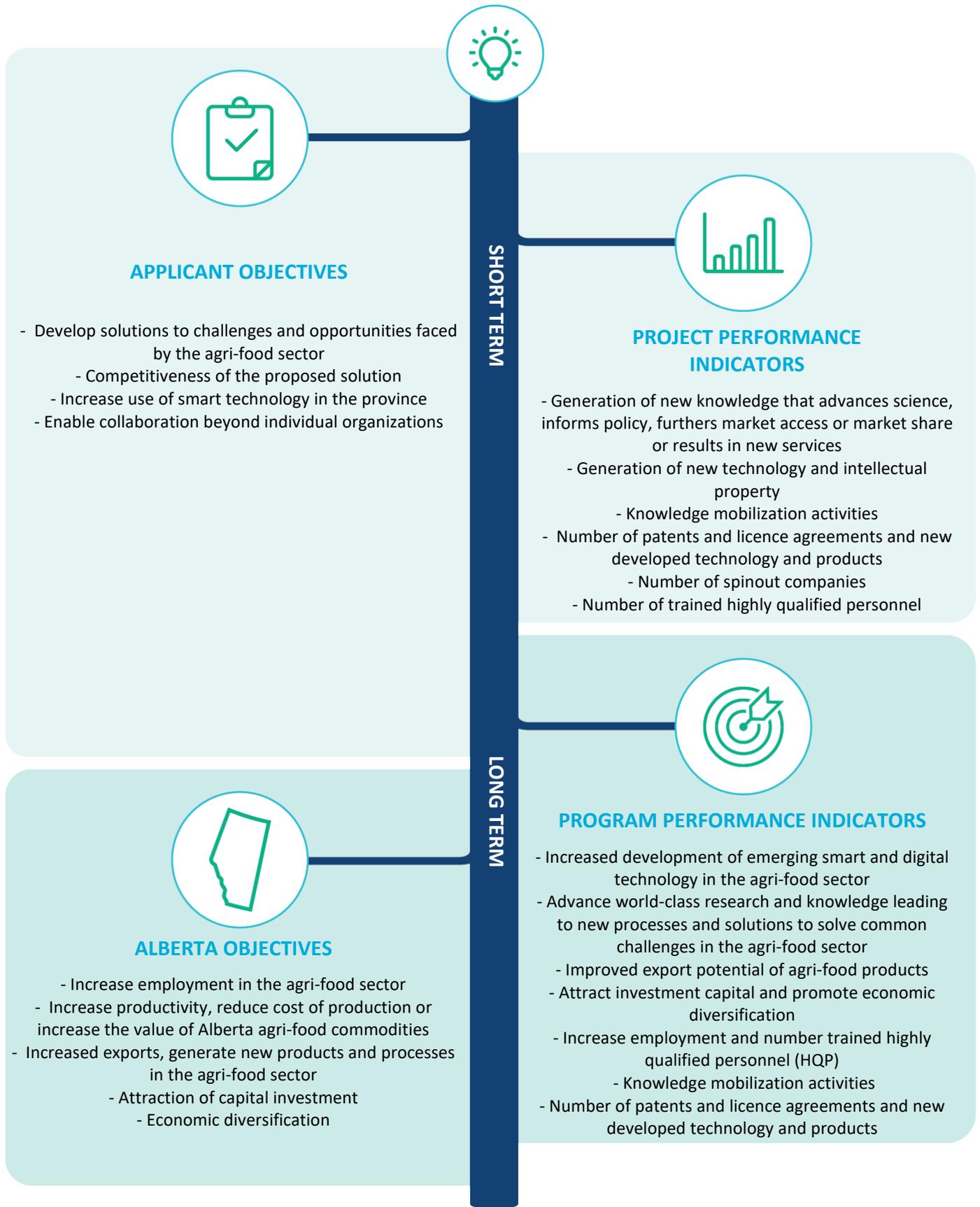
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Once Projects are completed, Alberta Innovates continues to monitor performance for five (5) years to accurately evaluate the economic, social and environmental benefits realized for the province.

All Investment Agreements outline performance indicators tracked over the course of the Project and the responsibilities of the Applicant to report on outcomes subsequent to the completion of the Project.

Alberta Innovates has a common set of performance metrics it monitors, both at the individual Project level and for the aggregate Program. These are highlighted on the next page.

# Objectives and Performance Metrics



## How Funding Works

### (a) Project Funding

Project funding can be up to, but not exceed, \$500,000 per project. The Program supports up to 100% of the total cash Project costs, but preference will be given to proposals with matching funding from the Applicant and/or other Project partners (including cash and in-kind support). Applicants are encouraged to seek cofunding from other funding agencies. There is no limit to the amount of stacking towards the applicant's contribution.

The maximum length for projects funded under this Program is **three (3) years** from project initiation.

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*Project funding can be up to but not exceed \$500,000 per project. Preference will be given to proposals with matching funding from the Applicant and/or other Project partners.*

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### (b) Eligible and ineligible expenses

Alberta Innovates only funds reasonable costs incurred subsequent to a signed Investment Agreement between Alberta Innovates and the Applicant. Any costs incurred prior to the signing of the Investment Agreement, or costs greater than market prices are deemed ineligible. Costs must be incurred between arm's length entities. Please refer to our standard form Investment Agreement found on our website to get an in-depth understanding of eligible and ineligible costs.

The chart below provides a high-level summary of eligible and ineligible expenses.

## Summary of Eligible and Ineligible Expenses

Category	Eligible Expenses	Ineligible Expenses
<b>Labour</b>	<ul style="list-style-type: none"><li>✓ Labour costs for those individuals specifically identified as working on the Project. This includes technical personnel and graduate students</li><li>✓ Time for specific activities on the project, prorated at usual annual salary rates, only for investigators not already employed by the institution or the collaborating institution conducting the project</li></ul>	<ul style="list-style-type: none"><li>✗ Salaries of individuals already employed by universities, colleges, other academic institutions, companies or government agencies participating in the Project</li><li>✗ Overhead costs charged to employee labour rates</li><li>✗ Professional training &amp; development</li><li>✗ Professional fees unless directly related to the Project</li><li>✗ Eligible time charged at rates above existing salary</li></ul>
<b>Materials</b>	<ul style="list-style-type: none"><li>✓ Reasonable material costs</li></ul>	<ul style="list-style-type: none"><li>✗ Sales and marketing collateral</li></ul>

<b>Capital Assets &amp; Software</b>	✓	Capital equipment (approval required)	✗	Acquisitions of land or buildings
	✓	Software or information databases	✗	The undepreciated value of eligible capital costs which extends beyond the Project term
<i>Note: Eligible costs will be pro-rated to the project time frame based on the asset's expected economic life</i>				
<b>Knowledge Transfer Activities</b>	✓	Software, data access, management and storage	✗	Costs relating to meals, entertainment, hospitality and gifts
	✓	Audio-visual, webinars and other costs to support uptake of results	✗	Passport or immigration fees
	✓	Costs relating to linkage and exchange such as meetings, teleconferences, videoconferences etc.	✗	Reimbursement for airfare purchased with personal frequent flyer programs
	✓	Publishing costs	✗	Commuting costs between place of residence and place of employment
<b>Sub-contractors</b>	✓	Services or products of another entity	✗	Costs associated with applying for government grants and programs
			✗	Provisions for contingencies, technical or professional journals
			✗	Routine testing and maintenance
<b>Travel</b>	✓	Travel, including mileage, low economy airfare, and accommodation for the purposes of executing the project	✗	Passport or immigration fees
			✗	Reimbursement for airfare purchased with personal frequent flyer programs
			✗	Commuting costs between place of residence and place of employment
			✗	Travel expenses related to marketing and/or commercialization activities. (Marketing and commercialization activities are outside the scope of this Program)
<b>Other</b>	✓	Costs which Alberta Innovates pre-approves in writing as an eligible expense	✗	Collection charges, allowance for interest on debt, fines and penalties
			✗	Federal and provincial income taxes, goods and services taxes
			✗	Expenses for projects or activities outside the approved Project

## HOW TO APPLY



### STEP 1 Expression of Interest

Applications will be submitted electronically using the Alberta Innovates online Grants Management System.

<https://albertainnovates.smartsimple.ca/>



### STEP 2 Full Proposal

Applicants whose Expression of Interest are approved are invited to submit a Full Proposal. The review process at this phase is highly competitive and only the highest-quality projects will be considered for funding.

An approved Full Proposal may require adjustments to the funding requested from Alberta Innovates and/or conditions that must be met to obtain funding.



### STEP 3 Project Management

For approved Full Proposals, Applicants will execute an Investment Agreement with Alberta Innovates to proceed with the activities of the Project.

Applicants will need to submit all the requested documentation to execute the agreements by **February 1, 2021**.

Project payments are based on milestone achievement and progress reporting.

Alberta Innovates continues to require reports for five years following the completion of the Project in order to measure long-term benefits.

There are no restrictions on the number of Expressions of Interest (EOIs) that can be submitted by any Applicant. However, Applicants are encouraged to be selective and bring forward only the most promising and highest quality ideas. Applicants are welcomed to contact members of the Smart Agriculture and Food team at any time during the Application process.

Applicants are encouraged to complete their submissions well in advance of the deadline. Alberta Innovates (AI) will not accept partial or incomplete submissions. Late submissions will not be accepted.

The deadline for submission of EOI is **Monday, September 14, 2020 at Mountain Time**. Applicants will be notified whether they have been shortlisted to submit a Full Project Proposal (FPP) on Monday, October 5, 2020 at 12:00 PM Mountain Time.

The deadline for submission of FPP is **Wednesday, November 4, 2020 at 12:00 PM Mountain Time**.

## EVALUATION PROCESS

Alberta Innovates retains the sole right to determine the evaluation process and does not disclose the names of its external reviewers to ensure their objectivity and impartiality. All external parties are subject to both confidentiality and conflict of interest policies set by Alberta Innovates.

Alberta Innovates leverages internal staff and external expert reviewers to evaluate Applications submitted. Alberta Innovates retains the sole right to determine the evaluation process and does not disclose the names of its reviewers to ensure their objectivity and impartiality. All reviewers are subject to confidentiality, non-disclosure, and conflict of interest policies set by Alberta Innovates.

Projects will be evaluated on the criteria described below. Each of the evaluation criteria is assigned a relative weighting. Applicants are encouraged to place more emphasis on the higher-weighted criteria.

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*The assessment criteria and all investment decisions are at the sole discretion of Alberta Innovates.*

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## TERMS AND CONDITIONS

This Program Guide is intended as a high-level overview of the Smart Agriculture and Food Digitalization and automation Challenge. It provides interested Applicants with a roadmap of what to expect over the lifecycle of a Smart Agriculture and Food Project, from the announcement of the program, through the Application stage, during the Project and post-completion. Should you have any questions about this guide or what is expected, please contact Alberta Innovates. Please be aware Alberta Innovates may modify this guide from time to time in keeping with any changes to the program.

Alberta Innovates will only correspond in writing and provide copies of the Application to the person named in the Application form as the one authorized to speak for the Applicant.

Once we have evaluated and approved an Application for funding, Alberta Innovates will require the Applicant to sign our standard form Investment Agreement. A copy of the [Investment Agreement](#) is available on the Alberta Innovates website. The Investment Agreement sets out in detail the roles, responsibilities and obligations of the various Parties to ensure a successful Project. Alberta Innovates will not provide any funding until the Investment Agreement has been signed by all Parties.

Alberta Innovates will only fund Applicants who have satisfied all eligibility criteria. Meeting the eligibility criteria does not guarantee access to funding, and all funding decisions will be made by Alberta Innovates at its sole discretion.

## DIVERSITY, EQUITY, AND INCLUSION (DEI)

We believe the Alberta research and innovation (R&I) ecosystem is stronger and more sustainable when it is broadly reflective of the overall diversity of our community. Alberta Innovates strives to ensure all interested and qualified parties have an equitable opportunity to participate and contribute.

Historically, there have been a number of groups/populations that have been under-represented in the Alberta R&I landscape including:

- Women entrepreneurs/researchers;
- Indigenous entrepreneurs/researchers;
- Remote/small community entrepreneurs/researchers; and
- New immigrant entrepreneurs/researchers.

We are guided by the principles of:

- Diversity – both internal and external participants to our processes are comprised of a varied composition of demographics;
- Equity – our processes support equal access across all demographics; and
- Inclusivity – our processes proactively work to include underrepresented segments of the R&I landscape.

Accordingly, as part of its commitment to Diversity, Equity and Inclusion (DEI), Alberta Innovates will request Applicants' permission to:

- Collect data in the Application on a voluntary basis to better understand diversity;
- Provide Application navigation support to Applicants from under-represented groups; and
- Integrate a DEI focus into its due diligence processes including striving to have diverse review committees to foster unbiased decision making.

## **CONTACT INFORMATION**

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